DOCUMENT RESUME

ED 247 516 CG 017 679

AUTHOR El-Zahhar, Nabil; Hocevar, Dennis
TITLE Anxiety, Arousability and Neuroticism.
PUB DATE 84
NOTE 22p.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Anxiety; *Arousal Patterns; Discriminant Analysis; High Schools; High School Students; *Neurosis; *Test Validity

ABSTRACT

With the availability of so many definitions of and assessment devices for anxiety, researchers have stressed that the dimensionality of anxiety needs further investigation. To examine the dimensionality of three components of anxiety (trait anxiety, arousability, and neuroticism) two studies were conducted. In the first study, 123 high school students completed the Eysenck Personality Inventory (EPI), which measures neuroticism, and Mehrabian's measure of stimulus screening (arousability). Factor analysis showed that arousability comprised two factors: emotionality and arousability. In the second study, 143 high school students (63 males, 83 females) completed an inventory that measured four factors: neuroticism, arousability, emotionality, and anxiety. The 60 assessment items were compiled from the State-Trait Anxiety Inventory (Spielberger, 1970), the EPI, and Mehrabian's measure. An analysis of the results showed a high correlation between two of the factors, (neuroticism and emotionality), and therefore yielded a three-factor model of anxiety, encompassing neuroticism/emotionality, anxiety, and arousability. The results support the discriminant validity of the three constructs. (BL)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED247516

ANXIETY, AROUSABILITY AND NEUROTICISM

Nabil El-Zahhar

University of Suez Canal

Dennis Hocevar

University of Southern California

1984

CG 017679

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

X This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Dennis Hocevar

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

ABSTRACT

Confirmatory factor analysis is used to test whether Spielberger's (1970) trait anxiety, Eysenck's (1973) neuroticism and Mehrabian's (1977, 1980) stimulus screening (arousability) are conceptually distinct. A 60 item inventory of items from Spielberger's (1970) State-Trait Anxiety Inventory (Spielberger et al., 1970), Eysenck's EPI, and Mehrabian's measure of stimulus screening were administered to 143 high school students. Results supported the discriminant validity of the three constructs.

Anxiety, Arousability and Neuroticism

Few researchers and clinicians would dispute the major role that the construct of anxiety has assumed in modern psychology. Within the large and diverse anxiety literature, there are many different definitions for anxiety (e.g., Spielburger, 1966; Lazarus, 1966, 1969; Izard, 1972; Malmo, 1966; Taylor, 1951, 1953; Epstein, 1972; Freud, 1923, May, 1950) and almost as many assessment techniques (see reviews by McReynolds, 1968; Cattell and Scheir, 1961; Sarason, 1960; Levitt, 1980). With so many definitions and assessment devices available, a number of researchers have stressed that the dimensionality of anxiety needs to be further investigated (McReynolds, 1968; Lamb, 1978; Malmo, 1966). While most researchers would agree with Endler and Bain's (1966) contention that "anxiety is not a unidimensional trait" (p. 221), most assessment devices do not reflect this assumption. One notable exception is the work of Cattell (1973) and Spielberger (1972) on the differentiation of state and trait anxiety. However, much remains to be done, particularly in the clarification of trait anxiety.

The major goal of the present study is to investigate the dimensionality of trait anxiety. More specifically, three components of anxiety will be examined. The first component is suggested by Spielberger's trait anxiety construct and is defined as "relatively stable individual differences in anxiety proneness". The second component is Eysenck's (1977) neuroticism construct, which is defined as a "general overresponsiveness, and liability to neurotic breakdown under

stress". The need for research that distinguishes these two components is obvious for conceptual and methodological reasons. Conceptually, both Eysenck (1973) and Spielberger (1972) recognize the similarity in these two constructs. For example, Spielberger refers to high scoring individuals on his inventory as "neurotically anxious" and Eysenck (1973) considers American measures of anxiety as measures of neuroticism. Methodologically, one need only inspect the Eysenck Personality Inventory and the State-Trait Anxiety Inventory to recognize the similarity in the items that they choose to measure their two constructs. On the basis of the above points, it is not surprising that a correlation of .71 between the Spielberger and Eysenck measures has been reported (Mehrabian, 1977), and that other researchers (e.g. Cronbach and Snow, 1977) consider the two constructs equivalent.

More recently a third related construct, arousability, has been identified by Mehrabian and his colleagues (1977). While early researchers were primarily interested in the state of arousability, contemporary theories have concerned themselves with the trait of arousability. Mehrabian (1977) defines the arousability trait as an individual difference dimension which subsumes the intercorrelated qualities of the initial amplitude of orienting reflex, number of trials for GSR habituation, various indicies of arousal response to increases in information rate of stimulation and weakness of nervous system. More specifically, an arousable person responds to a spike in information rate with a marked increase in the level of arousal

followed by a gradual decline to the baseline level of arousal. A less arousable individual responds to the same spike in information rate with a less pronounced increase in arousal and a more rapid decline to the baseline. Baseline arousal levels are comparable for both types of persons.

According to Mehrabian's (1977) theory, the converse of arousability is stimuls screening. This is because individual differences in arousability are due to less selectivity on the part of more arousable persons. Thus, the individual differences in arousability are associated with consistent differences in the ability to automatically screen less important components in various sensory channels. Further, stimulus screening involves a person's ability to screen the less relevant components to their everyday environment and to thereby reduce the effective complexity and random character in their environment.

To summarize, arousal level depends on individual differences in stimulus screening abilities and consequently the trait of arousability can be considered the converse of the trait of stimulus screening. Thus is is not surprising that both "arousability" and "stimulus screening" items are included on the Mehrabian (1970) stimulus screening measure. Furthermore, it would be accurate to refer to the inventory either as a measure of stimulus screening or as a measure of arousability. Nevertheless, to avoid confusion, the term arousability will be used throughout this paper. This term was chosen instead of stimulus screening because the term is more familiar to researchers in the area of anxiety.

While Mehrabian (1977) clearly expects arousability to differ from the constructs of anxiety and neuroticism, there is reason to question whether this newer construct is conceptually distinct from Spielberger's trait anxiety or Eysenck's neuroticism. First, arousability has long been recognized as a component of anxiety (e.g., Malmo, 1957, 1966; Epstein, 1967). Second, inspection of the items that Mehrabian uses to measure arousability suggests they have something in common with the Spielberger et al. and Ensenck measurements.

The purpose of the two present investigations is to examine the interrelationships between arousability, anxiety, and neuroticism. The major research question is whether these three constructs are conceptually distinct.

Study I

In a pilot study the Eysenck and Eysenck (1968) measure of neuroticism and the Mehrabian (1980) measure of stimulus screening/arousability were administered to 123 high school students in an introductory psychology class. Ninety percent of the sample was in the 12th grade and 51% of the sample was male. Items were factor analyzed using a principle factors solution, and an oblique rotation suggested that there were three factors: neuroticism, emotionality, and arousability. The emotionality and arousability factors were derived from the Mehrabian scale. The latter two factor descriptors are admittingly based on the subjective impressions of the authors so they will be further described with sample items.

Emotionality Factor

1. I feel "just miserable" for no good reason.
2. Strong emotions have a lasing effect on me.
3. I worry too much over something that does not matter.
4. I get emotionally moved even over simple things.

Arousability Factor (Stimulus Screening)

1. A sudden strong odor can have a great influence on me.
2. I am affected muchly by the hardness or softness of the furniture that I use.
3. Extremeness in temperature affects me a great deal.
4. Drastic changes in the weather affect me a lot.

While these results suggest that neuroticism, emotionality and arousability are conceptually unique, this interpretation is open to question, because the neuroticism scale was scored dichotomously and the arousability scale was scored on a scale of 1-9. Consequently, one could argue that the factors represented the different scaling techniques rather than different constructs. Despite this flaw, the pilot study did serve two purposes. First, it demonstrated that the Mehrabian construct may have two dimensions; emotionality and arousability; and second, the pilot study was used as a basis for item selection in Study II.

Study II

Subjects. The second study included 143 high school students (63 males and 83 females) in an introductory psychology course. Ninety-two percent of the sample were seniors.

Procedure. An inventory of 60 items was developed to measure four factors: neuroticism, arousability, emotionality, and anxiety. Fifteen neuroticism items were drawn from the

Eysenck and Eysenck (1968) EPI, and 15 trait anxiety items were drawn from the from the trait [illegible] of Spielberger's (1970) state/trait anxiety measure. On the basis of the previously described factor analysis, 15 emotionality items and fifteen arousability items were drawn from the Mehrabian measure of stimulus screening. In order to avoid "method" factors, all 60 items were presented in a common four point rating scale: not at all, sometimes, often and always.

Results

Typically, studies of this type are analyzed by means of exploratory factor analyses; however, the results of exploratory factor analysis are frequently ambiguous and do not directly provide hypothesis testing capability. More recently, confirmatory factor analytic techniques (Joreskog, 1969; Joreskog and Sorbom, 1978) have been developed to test the fit of a hypothesized factor model to an observed covariance or correlation matrix. Joreskog (1969) has proposed a chi-square (x^2) goodness-of-fit test designed to determine how well a model can account for observed correlations between measured variables. On the basis of the x^2 test, one can examine whether or not one hypothesized model is better than another hypothesized model (Bentler and Bonnett, 1980). In the present study, confirmatory factor analysis with LISREL IV computer program (Joreskog and Sorbom, 1978) was used to determine construct validity of contrasting theoretical models using goodness-of-fit test.

In analysis one, the hypothesis that a four-factor model (neuroticism, arousability, emotionality and anxiety) best represents the dimensionality of 60 selected items was tested. The factor pattern was restricted so that the 15 neuroticism items were free to load on factor one only. The fifteen emotionality items were free to load on factor two, the 15 anxiety items on factor three and the fifteen arousability items on factor four. These four factors were allowed to be correlated. These matrix specifications are used as input to the LISREL IV program for confirmatory factor analysis and the resulting estimates are output in a similar format (see Tables 1 and 2). Each loading from the factor loading matrix in Table 1 was tested for significance and all were significantly greater than zero. The factor intercorrelations presented in Table 2 indicate that all factor correlations are significant.

While the pattern of loadings shown in Table 2 generally support the initial four factor model, there is one potential shortcoming to the four-factor model. This potential shortcoming is indicated by the high correlation between emotionality and neuroticism (.981). Such a correlation indicates that these two constructs are not empirically distinct. To further investigate this possibility, a three factor model was formulated and examined using CFA techniques. In this model, the neuroticism and emotionality items load on the same factor. The results for the three factor model are given in Tables 3 and 4. Again, all factor loadings (Table 3) and factor correlations (Table 4) are significant. While the

correlations seem quite high in comparison to "typical" correlations, the reader is reminded that these correlations are disattenuated (i.e., corrected for measurement error).

As described earlier, an important advantage of confirmatory over exploratory factor analysis is in its hypothesis testing capability. When one model is a subset of a larger model, the two models can be statistically contrasted. This is done through an assessment of how well each factor model reproduces the original correlation matrix. In this case the three-factor model can be compared with the four-factor model using a chi-square goodness-of-fit test. Because the four-factor model included all of the parameters of the three factor model, it is by definition going to best reproduce the correlation matrix. However, it is of interest to know whether this difference is significant. In the event that it is not, the rule of parsimony dictates that the less complex model be accepted.

In the present example, the chi-square goodness-of-fit indices for the the three (df=1707) and four-factor models (df=1704) are 2818.49 and 2816.15, respectively. When these two values are statistically contrasted, the resultant chi-square difference is not significant, $X^2(3) = 2.34$. These findings, coupled with the previously reported correlation between emotionality and neuroticism, suggest that a three factor model is the most parsimonious. The three factors are neuroticism/emotionality, anxiety and arousability.

Discussion

The purpose of the present investigation was to investigate the dimensionality of the "anxiety-neuroticism-arousability" personality complex. Initially, a pilot analysis of responses to Mehrabian's arousability questionnaire indicated that arousability was comprised of two factors - emotionality and arousability. The pilot investigation was followed by a larger study involving selected items from Eysenck and Eysenck (1968) EPI questionnaire, Spielberger's (1970) STAI questionnaire and Mehrabian's (1980) arousability measure. Results suggested that three different anxiety-related factors exist. These were neuroticism, anxiety and arousability.

In reference to the voluminous literature that is based on the Eysenck EPI and Spielberger's STAI, the results suggest that the two questionnaires measure conceptually distinct constructs. In that the disattenuated correlation between these two constructs is high (.838), a reasonable question is whether this distinction will be useful in future research (and perhaps clinical) contexts. In that only future research will determine the answer to this question, it is obviously difficult to immediately answer. However, prior research with another construct suggests that the distinction between two highly correlated constructs can be a useful one. The related construct is test anxiety. Similar to the present study, the disattenuated correlation between two test anxiety components, worry and emotionality, is extremely high. For example, Hocevar, El-Zahhar and De Mello (1984) reported worry

emotionality correlations of .92, .78 and .89 in samples of American, Egyptian and Brazilian high school students, respectively. Despite these high correlations, there is a large body of literature that points to the usefulness of this distinction (see Deffenbacher, 1980; and Tryon, 1980; for reviews).

The results also indicated that there were two underlying dimensions to Mehrabian's (1980) stimulus screening questionnaire. These dimensions were emotionality and arousability. In addition, arousability wa found to be empirically distinct from anxiety and neuroticism in the factorial sense. However, arousability did correlate with both anxiety and neuroticism, and thus the present results support Mehrabian's contention that arousability should be related to anxiety and neuroticism. Finally, the emotionality component in the Mehrabian questionnaire was found to be equivalent (in the factorial sense) to the Eysenck neuroticism construct. It should be emphasized that the latter finding does not refute either theory. Rather, it suggests that despite the use of different labels, both theorists may be using items that indicate the same personality trait. Furthermore, the results suggest that researchers could justifiably consider scoring the Mehrabian (1980) questionnaire for two dimensions - emotionality and arousability.

References

Bentler, P. & Bonnet, D. G. Significance testing and goodness of fit in the analysis of covariance structures, Psychological Bulletin, 1980, 88, 588-607.

Cattell, R.B. Personality and Mood by Questionnaire. Jossey Bass: San Francisco, 1973.

Cattell, R.B. & Scheier, I.H. The Meaning and Measurement of Neuroticism and Anxiety. Ronald Press: New York, 1961.

Cronbach, L.J. & Snow, R.E. Aptitudes and Instructional Methods. Irvington: New York, 1977.

Deffenbacher, J. L. Worry and emotionality in test anxiety. In I. G. Sarason (Ed.), Test Anxiety. Hillsdale, N. J. Lawrence Erlbaum Associates, 1980.

Epstein, S. Towards a unified theory of anxiety.In B.A. Maher (Ed.) Progress in Experimental Personality Research (Vol. IV). Academic Press: New York, 1967.

Epstein, S. The nature of anxiety with emphasis upon its relationship to expectancy. In C.D. Spielberger, (Ed.), Anxiety: Current Trends in Theory and Research. (Vol. II). Academic Press, New York, 1972.

Eysenck, H.J. & Eysenck, S.B.J. The Manual of Eysenck Personality Inventory, Form A, Educational and Industrial Testing Service: San Diego, California, 1968.

Eysenck, H.J. Personality, Learning and Anxiety, In H.J. Eysenck (Ed.) Handbook of Abnormal Psychology (2nd Ed.). London: Pitman, 1973.

Eysenck, M.W. Human Memory, Theory, Research and Individual Differences, New York: Pergamon Press, 1977.

Freud, S. The Problem of Anxiety, New York: Norton, 1936. Originally published in 1923 in German under the title Inhibition, Symptom and Anxiety.

Hocevar, D., El-zahhar, N. & De Mello, M. Cross-cultural differences in Test Anxiety: Brazil, Egypt and the USA. Paper presented at the fifth international conference of the society for test anxiety research, Leiden, Netherlands, 1984.

Izard, C.E. Anxiety: A variable emotion of emotions. In C.D. Spielberger (Ed.), Anxiety: current trends in theory and research. (Vol. I). New York: Academic Press, 1972.

Joreskog, D. G. A general approach to confirmatory maximum likelihood factor analysis. Psychometrika, 1969, 34, 183-202.

Joreskog, K. G. & Sorbom, D. LISREL IV: Analysis of linear structual relationships by the method of maximum likelihood. Chicago: International Educational Services, 1978.

Lamb, D. Anxiety. In H. London & J.E. Exner, Jr. Dimensions of Personality, John Wiley & Sons, New York: 1978.

Lazarus, R.S. Psychological Stress and the Coping Process. New York: McGraw-Hill, 1966.

Lazarus, R.S. Patterns of Adjustment and Human Effectiveness. New York: McGraw-Hill, 1969.

Levitt, E. The Psychology of Anxiety. New York: Bobbs-Merrill, 1980.

Malmo, R.B. Anxiety and Behavioral Arousal. Psychological Review, 1957, 64, 276-287.

Malmo, R.B. Studies of Anxiety: Some clinical origins of the activation concept. In C.D. Spielberger (Ed.), Anxiety and Behavior. New York: Academic Press, 1966.

May, R. The Meaning of Anxiety. New York: Ronald Press, 1950.

McReynold, P. Advances in Psychological Assessment. Vol. I, Chapter XIII, Science and Behavior Book, Inc., 1968.

Mehrabian, A. Individual differences in stimulus screening and arousability. Journal of Personality, 1977, 45, 237-250.

Mehrabian, A. Basic Dimensions for a General Psychology Theory, Cambridge, 1980.

Sarason, I.G. Empirical findings and theoretical problems in the use of anxiety scales. Psychological Bulletin, 1960, 57, 403-415.

Spielberger, C.D. (Ed.) Anxiety and Behavior. New York: Academic Press, 1966.

Spielberger, C.D., Gorsuch, R.L. and Lushene, R.E., Self-Evaluation Questionnaire. Palo Alto, California: Consulting Psychologists Press, 1970.

Spielberger, C.D., Anxiety: Current Trends in Theory and Research. New York: Academic Press, 1972.

Taylor, J.A. The relationship of anxiety to the conditioned eyelid response. Journal of Experimental Psychology, 1951, 41, 81-92.

Taylor, J.A. A personality scle of manifest anxiety, Journal of Anormal Social Psychology, 1953, 48, 285-290.

Tryon, G. The measurement and treatment of test anxiety. Review of Educationl Research, 1980, 50, 343-72.

Table 1

Factor Loading for the Four-Factor Model

Items	Neuroticism	Emotionality	Anxiety	Arousability/ Stimulus Screening
N1	0.314	0.0	0.0	0.0
N5	0.226	0.0	0.0	0.0
N9	0.425	0.0	0.0	0.0
N13	0.324	0.0	0.0	0.0
N17	0.517	0.0	0.0	0.0
N21	0.565	0.0	0.0	0.0
N25	0.503	0.0	0.0	0.0
N29	0.530	0.0	0.0	0.0
N33	0.419	0.0	0.0	0.0
N37	0.469	0.0	0.0	0.0
N41	0.525	0.0	0.0	0.0
N45	0.572	0.0	0.0	0.0
N49	0.494	0.0	0.0	0.0
N53	0.269	0.0	0.0	0.0
N57	0.355	0.0	0.0	0.0
E2	0.0	0.342	0.0	0.0
E6	0.0	0.429	0.0	0.0
E10	0.0	0.394	0.0	0.0
E14	0.0	0.441	0.0	0.0
E18	0.0	0.498	0.0	0.0
E22	0.0	0.235	0.0	0.0
E26	0.0	0.372	0.0	0.0
E30	0.0	0.136	0.0	0.0
E34	0.0	0.141	0.0	0.0
E38	0.0	0.546	0.0	0.0
E42	0.0	0.674	0.0	0.0
E46	0.0	0.371	0.0	0.0
E50	0.0	0.535	0.0	0.0
E54	0.0	0.356	0.0	0.0
E58	0.0	0.536	0.0	0.0
A3	0.0	0.0	0.295	0.0
A7	0.0	0.0	0.373	0.0
A11	0.0	0.0	0.126	0.0
A15	0.0	0.0	0.634	0.0
A19	0.0	0.0	0.433	0.0
A23	0.0	0.0	0.491	0.0
A27	0.0	0.0	0.694	0.0
A31	0.0	0.0	0.191	0.0
A35	0.0	0.0	0.422	0.0
A39	0.0	0.0	0.629	0.0
A43	0.0	0.0	0.460	0.0
A47	0.0	0.0	0.513	0.0
A51	0.0	0.0	0.378	0.0
A55	0.0	0.0	0.607	0.0
A59	0.0	0.0	0.531	0.0
AR4	0.0	0.0	0.0	0.157
AR8	0.0	0.0	0.0	0.355
AR12	0.0	0.0	0.0	0.423
AR16	0.0	0.0	0.0	0.242
AR20	0.0	0.0	0.0	0.523
AR24	0.0	0.0	0.0	0.258
AR28	0.0	0.0	0.0	0.373
AR32	0.0	0.0	0.0	0.669
AR36	0.0	0.0	0.0	0.160
AR40	0.0	0.0	0.0	0.592
AR44	0.0	0.0	0.0	0.559
AR48	0.0	0.0	0.0	0.297
AR52	0.0	0.0	0.0	0.033
AR56	0.0	0.0	0.0	0.576
AR60	0.0	0.0	0.0	0.451

Table 2

Matrix of Factor Intercorrelations for the Four-Factor Model

	1	2	3	4
Neuroticism	1.000			
Emotionality	0.981	1.000		
Anxiety	0.855	0.815	1.000	
Arousability/ Stimulus Screening	0.604	0.684	0.418	1.000

Table 3

Factor Loadings for the Three-Factor Model

Items	LAMBDA ETA 1	ETA 2	ETA 3
N1	0.304	0.0	0.0
N5	0.216	0.0	0.0
N9	0.428	0.0	0.0
N13	0.319	0.0	0.0
N17	0.410	0.0	0.0
N21	0.566	0.0	0.0
N25	0.401	0.0	0.0
N29	0.545	0.0	0.0
N33	0.415	0.0	0.0
N37	0.462	0.0	0.0
N41	0.509	0.0	0.0
N45	0.572	0.0	0.0
N49	0.494	0.0	0.0
N53	0.261	0.0	0.0
N57	0.355	0.0	0.0
E2	0.341	0.0	0.0
E6	0.422	0.0	0.0
E10	0.392	0.0	0.0
E14	0.442	0.0	0.0
E18	0.496	0.0	0.0
E22	0.232	0.0	0.0
E26	0.377	0.0	0.0
E30	0.130	0.0	0.0
E34	0.136	0.0	0.0
E38	0.539	0.0	0.0
E42	0.680	0.0	0.0
E46	0.360	0.0	0.0
E50	0.528	0.0	0.0
E54	0.347	0.0	0.0
E58	0.538	0.0	0.0
A3	0.0	0.295	0.0
A7	0.0	0.373	0.0
A11	0.0	0.125	0.0
A15	0.0	0.634	0.0
A19	0.0	0.433	0.0
A23	0.0	0.488	0.0
A27	0.0	0.694	0.0
A31	0.0	0.192	0.0
A35	0.0	0.420	0.0
A39	0.0	0.631	0.0
A43	0.0	0.460	0.0
A47	0.0	0.513	0.0
A51	0.0	0.377	0.0
A55	0.0	0.607	0.0
A59	0.0	0.533	0.0
AR4	0.0	0.0	0.159
AR8	0.0	0.0	0.357
AR12	0.0	0.0	0.427
AR16	0.0	0.0	0.238
AR20	0.0	0.0	0.511
AR24	0.0	0.0	0.255
AR28	0.0	0.0	0.371
AR32	0.0	0.0	0.680
AR36	0.0	0.0	0.161
AR40	0.0	0.0	0.599
AR44	0.0	0.0	0.557
AR48	0.0	0.0	0.303
AR52	0.0	0.0	0.036
AR56	0.0	0.0	0.566
AR60	0.0	0.0	0.448

Table 4

Matrix of Factor Intercorrelations for the Three-Factor Model

	1	2	3
Neuroticism	1.000		
Anxiety	0.838	1.000	
Arousability/ Stimulus Screening	0.645	0.415	1.000